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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/655,564 | 09/03/2003 | Adriana Dumitras | 18602-08204 | 6437 |

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| EXAMINER | |
|---|---|
| FINDLEY, CHRISTOPHER G | |
| ART UNIT | PAPER NUMBER |
| 2621 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
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| 3 MONTHS | 03/02/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/655,564 | DUMITRAS ET AL. | |
| | Examiner | Art Unit | |
| | Christopher Findley | 2621 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *14 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's amendment filed on December 14, 2006, has been entered and made of record.

2. Applicant's arguments filed December 14, 2006, have been fully considered but they are not persuasive.

Re claim 1, the applicant argues that Chang relies upon global motion for frame analysis, whereas the claimed method eliminates the need to compute all global motion parameters. However, the claim language does not preclude the use of global motion parameters.

The applicant argues that Chang fails to hint at or suggest the detection of a pan or a zoom in a video sequence. However, Chang discloses pan and zoom detection on page 7, lines 11-20. The applicant also argues that there is no disclosure of using motion vectors to detect at least one of a pan and a zoom. On page 11, lines 8-15 (referring to Fig. 1), Chang states that vector field 114 is representative of the pan of the camera. Furthermore, Chang states that both camera zoom and pan information are derived (page 11, lines 16-18). The applicant next argues that Chang does not identify the at least two largest regions in each frame with substantially similar motion vectors. However, on page 17, lines 4-16, Chang states, "For each contiguous area, the number of associated blocks are compared to a predetermined minimum threshold value 640 in order to eliminate false small objects from being detected." Therefore, only the largest regions are identified.

The applicant argues that Chang does not disclose "identifying at least two largest regions in each frame having motion vectors with substantially similar orientation in a reference coordinate system," as recited in claim 1. However, digital images (frames, pictures, etc.) are conventionally comprised of background and foreground regions wherein backgrounds normally occupy larger regions in the image. Backgrounds are usually contiguous regions having substantially similar pixel values. Consequently, the motion vectors generated for these background regions in reference and target frames will have substantially similar orientation.

The applicant also argues that Chang does not disclose "comparing the percentages and statistical measure to threshold values to identify at least one of a pan and a zoom in a video sequence." However, Chang discloses on page 12, line 27 through page 13, line 22, that ratios (which are another form of expressing a percentage) are compared to adaptive thresholds and used to determine scene cuts. Chang also discloses on page 11, lines 8-15, that each scene segment is analyzed by using a histogram (statistical measure) to detect the pan of the camera. It is inherent that the values from the histogram must be compared to reference values (thresholds) in order to determine if the frame contains camera panning motion. Furthermore, Chang states that both pan and zoom information are derived (page 11, lines 16-18). In the frame analysis described, both percentages and statistical measure are compared to thresholds and used in the analysis to determine whether or not pan and zoom are present in a frame.

Applicant's further arguments are based on the assumed deficiency discussed above, and consequently are not persuasive. The original rejection is maintained, and a copy has been attached below for reference.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-15 and 17-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Chang et al. (PCT/US97/08266).

Re claim 1, Chang discloses methods and architecture for indexing and editing compressed video. In order to perform the analysis outlined in Chang it is inherent that a set of video frames are selected from a video sequence. Page 11, lines 10-15, of Chang state, "In Figure 1, the vector field 114 is representative of the pan of the camera which originally captured the video information which is being analyzed. Histogram 115 is used to detect the pan of the camera. Based on the derived operating parameters, moving objects 117 within the compressed video information 116 are detected and shape and trajectory features for such moving objects are extracted." The moving object(s) and the background constitute at least two regions, which are determined by their respective motion vector orientations. This excerpt also outlines the use of statistical analysis of the motion vector data (histogram). This statistical measure

(histogram) is also used to determine the pan and zoom motions of the camera (page 11, line 17: "derived camera zoom and pan information"). Page 12, lines 27-31, of Chang state, "In the Statistical Stage 230, three ratios, i.e., the number of intra-coded macroblocks to the number of forward motion vectors, the number of backward motion vectors to the number of forward motion vectors, and the number of forward motion vectors to the number of backward motion vectors, are calculated 231 in order to detecting direct scene cuts in P, B, and I frames, respectively." Each object and background region contains a set of macroblocks with similar vector orientation. Therefore, the ratio of motion vectors for each object or background region to the number of macroblocks in the frame give the percentage of the frame covered by those regions.

Re claim 2, Chang's abstract section states, "Video objects (117) are detected and indexed by analyzing a compressed bitstream to locate scene cuts (112), estimating operating parameters for a camera which initially viewed the video (114), and detecting one or more moving video objects represented in the compressed bitstream by applying global motion compensation which account for the estimated operating parameters." Chang also states in page 8, lines 1-6, "the apparatus includes means for analyzing the compressed bitstream to locate scene cuts therein and to determine at least one sequence of fields or frames of video information which represents a single video scene, means for estimating one or more operating parameters for a camera which initially viewed the video scene by analyzing a portion of the compressed bitstream which corresponds to the video scene." The referenced invention analyzes

and indexes video by identifying individual scenes. Chang page 10, lines 25-26, state that the "compressed bitstream is examined for scene cuts 112 and broken into shot segments," which selects that scene for analysis.

Re claim 3, page 13, lines 15-20, of Chang state, "Also in the detection stage 240, the variance of DCT DC coefficients calculated for I and P frames in 232 is used in two ways. For I frames, this variance information is used together with the ratio of the number of forward motion vectors to the number of backward motion vectors determined in 231 in order to detect candidate scene changes 242. If the ratio is above a predetermined threshold, the frame is marked as containing a suspected scene cut." In this detection stage the motion vector information is used to detect scene cuts in the video.

Re claim 4, Figure 4 of Chang is a vector diagram, which serves to explain global and local motion. The x and y coordinates are contained in a Cartesian coordinate system and used in Equation (1) on page 14. Line 17 of page 14 states, "(x,y) is the coordinate of a macroblock in the current frame."

Re claim 5, page 12, lines 27-31, of Chang state, "In the Statistical Stage 230, three ratios, i.e., the number of intra-coded macroblocks to the number of forward motion vectors, the number of backward motion vectors to the number of forward motion vectors, and the number of forward motion vectors to the number of backward motion vectors, are calculated 231 in order to detecting direct scene cuts in P, B, and I frames, respectively." Each object and background region contains a set of macroblocks with similar vector orientation. Therefore, the ratio of motion vectors

corresponding to each object or background region to the number of macroblocks in the frame give the percentage of the frame covered by those regions.

Re claim 6, Chang discloses using a histogram for pan and zoom detection. A histogram is a graphical representation of distribution for a data set. Variance is the average squared deviation from the mean and therefore is an inherent statistical trait of a histogram.

Re claim 7, Chang discloses "an apparatus for detecting moving video objects in a compressed digital bitstream which represents a sequence of fields or frames of video information for one or more previously captured scenes of video." (See fig. 1: 100). This apparatus (100) carries out the operations discussed above. In Chang, the apparatus or system (100) that detects scene cuts, pan, and zoom in a digital video bitstream utilizes a digital processor (131, i.e. a computer) for performing these operations.

Claim 8 has been analyzed and rejected with respect to claim 2 above.

Claim 9 has been analyzed and rejected with respect to claim 3 above.

Claim 10 has been analyzed and rejected with respect to claim 4 above.

Claim 11 has been analyzed and rejected with respect to claim 5 above.

Claim 12 has been analyzed and rejected with respect to claim 6 above.

Re claim 13, in Chang, the system (100) with a processor (131) for carrying out the operations discussed above, and also in claim 13, utilizes a computer readable medium (it's inherent since the processor 131 is a computer which would necessitate

executing a program readable from a computer readable medium as claimed) with instructions to be carried out by said processor (131).

Claim 14 has been analyzed and rejected with respect to claim 2 above.

Claim 15 has been analyzed and rejected with respect to claim 3 above.

Claim 17 has been analyzed and rejected with respect to claim 5 above.

Claim 18 has been analyzed and rejected with respect to claim 6 above.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (PCT/US97/08266).

Re claim 16, Chang does not specifically mention the use of polar coordinates in the motion vector analysis. However, Chang does use Cartesian coordinates (see fig. 4). The Examiner takes Official Notice that one of ordinary skill in the art would have found it obvious to convert the Cartesian motion vector representation to polar coordinates as a personal preference for visual and/or mathematical representation. Polar coordinates provide no advantage over Cartesian coordinates and are simply a different way of representing the same data.

***Conclusion***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Scene and content analysis from multiple video streams (Guler, S.)
Applied Imagery Pattern Recognition Workshop, AIPR 2001 30th
10-12 Oct. 2001 Page(s):119 – 125

"We start with automatic detection of scene changes, including camera operations such as zoom, pan, tilts and scene cuts. For each new scene, camera calibration is performed, the scene geometry is estimated, to determine the absolute positions for each detected object. Objects in the video scenes are detected using an adaptive background subtraction method and tracked over consecutive frames."

b. Global zoom/pan estimation and compensation for video compression (Tse, Y.T.; Baker, R.L.)
International Conference on Acoustics, Speech, and Signal Processing, 1991.
ICASSP-91., 1991
14-17 April 1991 Page(s):2725 - 2728 vol.4

"An algorithm is presented for estimating and compensating camera zooms and pans. It models the global motion in each frame with just two parameters: a zoom factor and a two-dimensional pan vector both based on local displacement vectors found by conventional means (such as block matching)."

c. Apparatus for converting screen aspect ratio (US 20010017890 A1)

"The present invention extracts motion vector by performing block motion matching operation, and when the input image is a digitally encoded bit stream, it extracts motion vectors from the decoded data. The motion vectors are subjected to filtering in terms of time and space. The apparatus extracts global motion information from the motion vectors that have been filtered."

***Contact***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Findley whose telephone number is (571) 270-1199. The examiner can normally be reached on Monday-Friday 7:30am-5pm, Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Christopher Findley/

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